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Attorney Docket No. GEMS8081.205-1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Sellers, Michael
Serial No.	:	10/709,455
Filed	:	May 6, 2004
For	:	SYSTEM AND METHOD FOR REDUCING AUDITORY PERCEPTION OF NOISE ASSOCIATED WITH A MEDICAL IMAGING PROCESS
Group Art No.	:	3454
Examiner	:	Shrivastav, B.

CERTIFICATION UNDER 37 CFR 1.8(a) and 1.10

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AMENDMENT/RESPONSE TO OFFICE ACTION
MAILED JULY 26, 2005

Dear Sir:

Responsive to the Office Action mailed July 26, 2005, please amend the Application as follows:

In the Claims

1. (Original) A medical imaging scanner system comprising:

a medical imaging scanner configured to scan an imaging subject within an imaging area, wherein the medical imaging scanner emits system noise when in operation; and

an emitter system constructed to emit an inaudible signal having properties to reduce auditory perception of the system noise about at least a portion of the imaging area.

2. (Original) The medical imaging scanner system of claim 1 further comprising a parametric sound generator configured to generate a signal having properties to reduce perception of the system noise.

3. (Original) The medical imaging scanner system of claim 1 wherein the medical imaging scanner is a magnetic resonance image scanner and the emitter system is arranged outside of a magnetic field of the magnetic resonance image scanner.

4. (Original) The medical imaging scanner system of claim 1 wherein the emitter system includes an ultrasonic emitter capable of columnular emissions.

5. (Original) The medical imaging scanner system of claim 4 wherein the ultrasonic emitter is mounted external to the medical imaging scanner.

6. (Original) The medical imaging scanner system of claim 4 wherein the ultrasonic emitter is arranged such that the columnular emissions are directed at a location to provide an imaging subject with a substantially noise free environment.

7. (Original) The medical imaging scanner system of claim 1 wherein at least a portion of the emitter system is arranged a distance from the imaging area.

8. (Original) The medical imaging scanner system of claim 1 wherein the emitter system is directed toward at least one of the imaging subject area and an operator area.

9. (Original) The medical imaging scanner system of claim 1 further comprising another emitter system constructed to reduce perception of system noise about at least a portion of an operator area.

10. (Original) The medical imaging scanner system of claim 1 wherein the emitter system is configured to directionally emit the inaudible signal.

11. (Original) The medical imaging scanner of claim 1 wherein the system noise reduction occurs near an imaging subject's ears.

12. (Original) The medical imaging scanner system of claim 1 wherein the emitter system includes an emitter that produces a column of ultrasonic energy in front of the emitter that contains properties to produce cancellation audio frequencies when intermixed with a non-linear medium.

13. (Original) The medical imaging scanner system of claim 12 wherein the non-linear medium includes atmospheric air.

14. (Original) The medical imaging scanner system of claim 12 wherein the cancellation audio frequencies are demodulated along the column of ultrasonic energy.

15. (Original) The medical imaging scanner system of claim 14 wherein the demodulated cancellation audio frequencies interact with the system noise to reduce perceivable system noise at the imaging area.

16. (Original) The medical imaging scanner system of claim 15 wherein the imaging area is an area of imaging subject sound reception.

17. (Original) The medical imaging scanner system of claim 1 wherein the system noise is reduced as perceived by an imaging subject during a scanning operation.

18. (Original) A method of medical imaging comprising:

performing a medical imaging process upon an imaging subject, wherein the medical imaging process produces a noise byproduct; and

emitting an inaudible signal configured to diminish auditory perception of the noise byproduct.

19. (Original) The method of claim 18 further comprising performing the medical imaging process on an imaging volume and emitting the inaudible signal outside of the imaging volume.

20. (Original) The method of claim 18 further comprising columnly emitting the inaudible signal to diminish auditory perception of the noise byproduct within a selected volume.

21. (Original) The method of claim 20 wherein the selected volume includes one of an imaging volume and an operating volume.

22. (Original) The method of claim 18 further comprising producing a column of ultrasonic energy configured to interact with atmospheric air to produce anti-noise audio frequencies when intermixed with an environmental air.

23. (Original) The method of claim 18 wherein the medical imaging process includes a magnetic imaging resonance imaging process.

24. (Original) An MRI apparatus comprising:

an MRI system having a plurality of gradient coils positioned about a bore of a polarizing magnet to impress a polarizing magnetic field, and an RF transceiver system and an RF switch controlled by a pulse module to transmit RF signals to an RF coil assembly to acquire MR images; and

a parametric signal generator configured to generate ultrasonic signals to reduce auditory perception of noise produced by the MRI system during operation.

25. (Original) The MRI apparatus of claim 24 wherein the ultrasonic signals are configured to induce anti-noise signals upon interaction with environmental air.

26. (Original) The MRI apparatus of claim 25 wherein the anti-noise signals are contained within a propagation column.

27. (Original) The MRI apparatus of claim 26 wherein the propagation column is focused on at least one of an operator area and the bore of the polarizing magnet.

28. (Original) The MRI apparatus of claim 24 wherein the ultrasonic signals contain modulated ultrasonic audio frequencies configured to generate demodulated cancellation audio frequencies upon interacting with a nonlinear medium.

29. (Original) The MRI apparatus of claim 28 wherein the demodulated cancellation audio frequencies interact with noise produced by the MRI system to reduce perception of the noise.

30. (Original) The MRI apparatus of claim 24 wherein the parametric signal generator is disposed remotely from the MRI system.

31. (Original) The MRI apparatus of claim 24 further comprising an emitter configured to deliver an ultrasonic signal to at least a portion of the MRI system.

REMARKS

Claims 1-31 are pending in the present application. In the Office Action mailed July 26, 2005, the Examiner rejected claims 1-3, 7, 8, 10, 11, 17, 18, 22-25, 30, and 31 under 35 U.S.C. §102(b) as being anticipated by Ehman (US 5,592,085). Claims 4-6, 9, 12-16, 19-21, and 26-29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ehman in view of Friedlander (US 5,313,945).

The Examiner rejected claims 1, 18, and 24 stating that "Ehman teaches an emitter system constructed to emit an inaudible signal (of ultrasound range) having properties to reduce perception of the system noise about at least a portion of the imaging area (figure 1, numerals 129, 130; column 8, lines 29-44)." Office Action, p. 2. Applicant respectfully disagrees.

Ehman teaches that a pulse generator module 121 "produces sync pulses through a serial link 128 to a wave generator and amplifier 129." Col. 8, lns. 29-31. Ehman further teaches that "[t]he wave generator produces a sinusoidal voltage which is synchronized to the frequency and phase of the received sync pulses and this waveform is output through a 50 watt, dc coupled audio amplifier. A frequency in the range of 20 Hz to 1000 Hz is produced depending on the particular object being imaged, and it is applied to a transducer 130." Col. 8, lns. 31-36. Thus, Ehman teaches that the frequency range of the signal is 20 Hz to 1000 Hz.

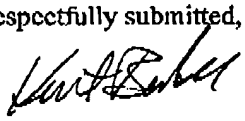
However, one skilled in the art will readily recognize that a sinusoidal voltage signal that is in the frequency range of 20 Hz to 1000 Hz is audible. That is, the sinusoidal voltage signal of Ehman can be heard by an imaging subject. It is well known that human hearing generally falls in the range of 20 Hz to 20,000 Hz. As stated above, the sinusoidal voltage signal taught in Ehman is in the frequency range of 20 Hz to 1000 Hz, which falls within the frequency range audible to humans. A sinusoidal voltage signal in the frequency range of 20 Hz to 1000 Hz is not inaudible or of ultrasound range as the Examiner suggests. As such, Ehman does not teach or suggest that called for in claims 1, 18, 24 and the claims that depend therefrom.

Claims 4-6, 9, 12-16, 19-21, and 26-29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ehman in view of Friedlander. Applicant respectfully disagrees with the Examiner with respect to the art as applied, but in light of claims 4-6, 9, 12-16, 19-21, and 26-29 depending from what is believed otherwise allowable claims, Applicant does not believe additional remarks are necessary and, therefore, requests allowance of claims 4-6, 9, 12-16, 19-21, and 26-29 at least pursuant to the chain of dependency.

Therefore, in light of at least the foregoing, Applicant respectfully believes that the present application is in condition for allowance. As a result, Applicant respectfully requests timely issuance of a Notice of Allowance for claims 1-31.

Applicant appreciates the Examiner's consideration of these Amendments and Remarks and cordially invites the Examiner to call the undersigned, should the Examiner consider any matters unresolved.

Respectfully submitted,



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